

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN THREAD FEEDERS

(71) We, SOBREVIN SOCIETE DE BREVETS INDUSTRIELS - ESTABLISSEMENT, an Etablissement of Liechtenstein, of Aeule Strasse 151, 9490 Vaduz/Furstentum, Liechtenstein, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a thread feeder for continuously feeding thread to, for example, a knitting machine, the feeder having a support to the head end of which the thread is applied tangentially, so as to form a single-layer storage coil, and from which the thread is removed by pulling it off, at least eventually in the axial direction.

In our earlier British Patent Specification No. 1 306 053 it was proposed to apply the thread tangentially to one end of a polygonal support by leading the thread through a hollow motor-driven axle and through a thread lead fixed to a disc mounted on the hollow axle. The coil of thread stored on the support is pushed towards the other end of the support by a cam cylinder mounted on the disc. The thread is taken from the thread feeder by pulling it off over the edge of a second disc attached to the support at its other end. This construction has the advantage of being simple, and particularly with regard to the arrangement of the support in the structure. The thread feeder is capable of handling, satisfactorily, comparatively thick, smooth thread. On the other hand, difficulties arise in attempting to feed fibrous thread, for example jute thread. In this case, and particularly in the storage coil contains only a few turns of thread, the length of thread being pulled off, that is to say the length of thread moving between the support and the rim of the disc tends to collide with the length of thread

being fed onto the support, that is to say the length of thread between the thread lead and the support, and this can result in the thread becoming tangled.

Therefore, starting from a thread feeder 50 of conventional type, and retaining its simplicity of construction and the favourable application of the thread layers to the support, the aim of the present invention is to ensure that the thread is always pulled 55 correctly off the support, irrespective of the nature of the thread material.

Thus, according to the invention a thread feeder has a support for supporting a coil of thread, a thread lead for delivering 60 thread tangentially to one end of the support, and a cap mounted over the one end of the support and having a skirt surrounding the support whereby the thread is withdrawn from the support over the free edge 65 of the skirt.

The invention allows a thread feeder to be constructed which is more effective than the previous ones. The thread feeder according to the invention is capable of feeding 70 thread of any kind reliably, irrespective of the structure of the thread material. There is no longer any risk of the length of thread which is being pulled off colliding with the length of thread being fed onto the support because the length of thread 75 being pulled off is delivered over the free edge of the skirt of the cap, which extends approximately over the axial length of the storage coil of thread. The cap can fulfil 80 several functions; in addition to providing a free edge over which the thread is pulled off, the cap can also act as the support for the thread lead. If a polygonal support is used the cap can also support the cam disc 85 which pushes the layers of thread along over the surface of the support. To allow the operator to inspect the layers of thread coiled on the support, the cap can, for example, be made of a transparent material. 90

[Price 25p]

A damping ring which cooperates with the free edge of the cap's skirt ensures that the length of thread between the edge and the support is always taut. The damping ring preferably cooperates with the free edge of the skirt, and is preferably attached to the motor housing, which is itself positioned behind the rear end of the support. The damping ring is adjustable in position, axially relative to the free edge of the skirt, so as to allow the damping effect, that is to say the braking of the thread, to be adjusted to suit the particular thread material. A screw thread on the damping ring provides continuous adjustment.

In versions of the invention in which the cap is stationary when the thread feeder is in operation, damage to the thread is reduced due to the fact that the thread is not pulled off in a direction of rotation opposite to that of the skirt edge.

The cap can be prevented from rotating in various ways, and a particularly good solution is to mount the cap so that it can rotate freely on the motor drive-shaft, a weight being attached at one side in the interior of the cap. This arrangement has the advantage that when the thread tension changes an abrupt increase in friction between the thread and the free edge is prevented by a limited rotation of the cap.

The support can be in the form of a polygon, or it can be a drum. Furthermore, the support itself can rotate or remain stationary, and the storage coil may be pushed along either by rotating pusher discs or by sloping feed surfaces on the coil support itself.

Two examples of thread feeders in accordance with the invention will now be described with reference to the accompanying drawings, in which:—

Figure 1 is a partly sectioned side view of one thread feeder;

Figure 2 is a cross-section taken along the line II - II in Figure 1; and,

Figure 3 is a partly sectioned side view of a second version of thread feeder.

As shown in Figure 1, the thread feeder has a motor housing 1 containing an electric motor (not shown). The motor housing 1 has a front flange 2 from which the motor drive shaft 3 projects forwards (downwards as shown). Fixed to the forward end of the motor drive shaft 3 by a screw 7 there is an outer housing in the form of a cap 4, the screw 7 penetrating through the bottom 6 of the cap. The cap is positioned so that its interior face 5 is facing towards the front flange 2 of the motor housing.

Projecting forwards from the front flange 2 into the cap interior 5 there is a polygonal support consisting of four rods 8, 9, 10 and 11 arranged at the corners of a

square, as seen in cross-section in Figure 2. Each support rod is itself circular in cross-section.

Each rod has at its forward end an internal recess 12 for accommodating a face-cam disc 13, which is itself integral with the cap bottom 6. Thus, part of each rod is located radially outwards of the outer peripheral surface 13' of the cam disc 13. On the other hand, the outer peripheral surface 13' itself projects radially outwards beyond the straight lines joining neighbouring support rods, that is to say the straight lines occupied by the thread F when it has been coiled on the support rods by a thread lead 14. The thread lead 14 is an insert in the cap bottom and is located radially outwards of the outer peripheral surface 13' of the cam disc.

When the thread feeder is in operation the thread F is conveyed to the support through a longitudinal channel 3' in the motor drive-shaft 3, the longitudinal channel passing right through the screw 7.

The coil of thread, coiled on the support by the thread lead 14, is pushed backwards over the surface of the support by an edge face 15 of the cam disc 13, this being the working face of the cam. The cam face 15 has a peak at 15'. The outlet mouth of the thread lead 14 rotates in a plane which is axially forwards of, that is to say further away from the motor than, the plane in which the peak surface 15' of the cam face 15 rotates. The cam face 15 rises continuously all the way to the cam peak surface 15'. The angle between the thread lead 14 and the cam peak 15' is such that the cam peak constantly follows along after the thread lead.

The depth of the cap 4 is approximately equal to the length of the stored coil of thread and the thread is pulled off the coil over the rounded free edge 16 of the cap skirt 17. The free edge 16 cooperates with the brushes 18 of a damping ring 19 which is screwed by an internal thread 20 onto an external thread 21 of a collar 22 projecting forwards from the front flange 2 of the motor housing.

By screwing the damping ring 19 clockwise or anticlockwise it can be moved towards or away from the free edge 16 of the skirt 17, for adjusting the degree of damping applied to the thread being taken by the user. The adjustment can also be used for compensating for abrasion of the brush tips.

The skirt 17 can if desired be made of a transparent material, to permit observation of the rings of the coil.

In a second version of a thread feeder, represented in Figure 3, the cap 4' is mounted freely rotatable on the forward end of the motor drive-shaft 3. To reduce

friction between the cap and the motor drive-shaft 3 a ball or roller bearing 23 is installed in the cap bottom 6'.

In order to ensure that when the thread feeder is in operation the cap 4' remains stationary, even though the motor drive-shaft 3 is rotating, a weight 24 is fixed to the inner surface of the skirt 17. The cap therefore always retains a position with the weight 24 vertically below the motor drive shaft 3. The weight 24 is great enough to ensure that tension applied by the user in pulling the thread off the thread feeder cannot rotate the cap.

In this second example of the invention the thread lead 14' is mounted on the circular base plate 25 of the cam disc 13 and the base plate 25 is keyed to the motor drive-shaft 3 by a key 26. The base plate 25 has a longitudinal channel 3' and a radial bore 27 connecting the longitudinal channel 3' to the thread lead 14', the thread passing through these two channels. To facilitate threading the thread lead 14' has an opening 28 which can be brought into line with an opening 29 in the cap side-wall 17. If desired, threading can be facilitated by making the cap detachable.

30 WHAT WE CLAIM IS:—

1. A thread feeder having a support for supporting a coil of thread, a thread lead for delivering thread tangentially to one end of the support, and a cap mounted over the one end of the support and having a skirt surrounding the support, the thread being arranged to be withdrawn from the support over the free edge of the skirt.

2. A thread feeder according to claim 1, wherein the free edge of the skirt co-operates with brushes on a damping ring.

3. A thread feeder according to claim

1 or claim 2, wherein the damping ring is adjustable in position relatively to the skirt edge.

4. A thread feeder according to any one of the preceding claims, in which the cap is arranged to remain stationary when the feeder is in operation.

5. A thread feeder according to claim 4, in which the cap is held stationary by a weight attached to the skirt of the cap.

6. A thread feeder according to any one of claims 1 to 3, in which the cap is arranged to rotate with the thread lead about the support.

7. A thread feeder according to any one of the preceding claims, which further includes a thrust surface at one end of the support for urging the delivered thread axially along the support towards the other end of the support, the support being polygonal in cross-section perpendicular to the coil axis and being formed at its one end by a number of separate parallel rods positioned at the corners of the polygon, the support and the thrust surface being rotatable relatively to one another about the axis of the, and the radially outermost extent of the thrust surface being such that, upon the relative rotation, the thrust surface overlaps and engages the thread stretched between two adjacent rods but passes inwardly of the radially outermost surfaces of the rods.

8. A thread feeder according to claim 1, substantially as described with reference to Figures 1 and 2, or Figure 3 of the accompanying drawings.

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7. A thread feeder according to any one of the preceding claims, which further includes a thrust surface at one end of the support for urging the delivered thread axially along the support towards the other end of the support, the support being polygonal in cross-section perpendicular to the coil axis and being formed at its one end by a number of separate parallel rods positioned at the corners of the polygon, the support and the thrust surface being rotatable relatively to one another about the axis of the, and the radially outermost extent of the thrust surface being such that, upon the relative rotation, the thrust surface overlaps and engages the thread stretched between two adjacent rods but passes inwardly of the radially outermost surfaces of the rods.

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